Naval Facilities Engineering Command

BRAC PMO West

ISS Pilot Study Sampling Plan

BCT Meeting

Hunters Point Naval Shipyard

September 4, 2014

In Situ Solidification/Stabilization Performance Evaluation

- Semi-Dynamic Leaching (SDL) test results are the primary metric for evaluating the *leachability* of contaminants from the ISS pilot study area
- The SDL test measures the leaching of COC/COECs over time in order to determine the contaminant diffusion rates and predict future water quality
  - –If COC/COEC concentrations in the leachate are less than the aquatic criteria, then diffusion modeling is not necessary
  - –If COC/COEC concentrations in the leachate are greater than aquatic criteria, then diffusion modelling is conducted to predict future water quality

Technology	Type of Technology	Performance Objective	Performance Metrics
ISS	LNAPL mass control technology	Reduce LNAPL mobility through reducing permeability and contaminant leachability within the Target Treatment Zone.	Reduce permeability in the Target Treatment Zone to 10^{-6} to 10^{-7} cm/sec. Reduce leachability of LNAPL to achieve maximum concentrations of COECs below water quality criteria for aquatic wildlife (**Table 3-2**) and TPH to less than 1,400 µg/L in groundwater discharging to the Bay.

In Situ Solidification/Stabilization Performance Evaluation

- Diffusion rates could not be calculated for metals during the bench study due to:
  - –the analytical method detection limit for Zinc was greater than the aquatic criteria because of *ion concentrations in the synthetic groundwater*
  - –the analytical method detection limit for PCBs was greater than the aquatic criteria due to relatively *small volumes of water* used for the analysis

Parameter	units	Aquatic Criteria	2 hr	24 hr	48 hr	72 hr	7 day	14 day	28 day	42 day	Blank Leaching Fluid
GRO	µg/L	1400	<300	<300	<300	<300	<300	<300	NA	NA	NA
DRO	µg/L	1400	<210	<160	<110	<150	<100	<100	NA	<96	NA
MRO	µg/L	1400	<210	<160	<110	<150	<100	<100	NA	280J	NA
Cu	µg/L	28	15	14	4.9	11	7.2	<14	<68	<68	<68
Ni	µg/L	96.5	9.2	10	<12	<12	5.6	5.2	21J	<60	<60
Pb	µg/L	14.4	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	26J	<26	<26
Zn	µg/L	81	<100	<100	<100	<100	<100	<100	930J	<500	<500
PCB 1260	µg/L	0.03	<0.6	0.36J	<0.52	<0.57	<0.43	<0.61	NA	NA	NA

In Situ Solidification/Stabilization Performance Evaluation

Two Types of Samples Collected:

1) **Core Samples:** Collected by drilling through the solidified columns
2) **Cylinder Samples:** Collected during the mixing of the column

Two Semi-Dynamic Leaching (SDL) tests will be conducted on each type of sample (a total of four SDL tests)**:**

- SDL run with synthetic groundwater
  - –Replicates groundwater at the site
- SDL run with DI water
  - –Allows for lower detection limits

- **Column/cylinder volumes will be increased in order to increase the volume of leachate for analysis (to lower the detection limit for PCBs)**

Additional diffusion modeling may be done to supplement the results

Variations from the Work Plan

- **An additional three SDL tests (four total) on the ISS columns**
  - –Core sample with synthetic groundwater
  - –Core sample with DI water
  - –Cylinder sample with DI water
  - –Cylinder sample with synthetic groundwater
- **Synthetic Precipitation Leaching Procedure will be adjusted to reach lower detection limits**
  - –Liquid:Solid ratio will be adjusted from 2:1 (mL:g) to 10:1
  - –DI water will be used instead of synthetic groundwater

Return to the Bench Scale Study

- **In the ISS Pilot Study Design, the Navy concluded that the best mix for full scale consists of:**
  - 30% (w/w) Bay Mud (20 feet)
  - 18% (w/w) Bentonite Slurry
  - 20% (w/w) cement

- **Based on the results of the SPLP tests, the RWQCB recommended testing a mix with activated carbon**
  - As an addition to the Bench Scale Study, we will conduct the SDL test on Mix 5 (30% Bay Mud, 18% Bentonite Slurry, 20% cement, 2% GAC) from the bench scale study
    - Permeability for this mix was an order of magnitude higher than the chosen mix
    - The additional of carbon is not anticipated to have an effect on metals